

b) passage of the oxidized form of the solid to a reaction zone into which a reducing stream is fed, and its reaction with a hydrocarbon;

c) recovery of the reduced form of the solid and its feeding to the first reaction zone;

d) heat supply.

3. (Amended) The process of claim 2, wherein the heat supply is preferably effected during one of the two operations (b) and (c).

4. (Amended) The process of claim 2, wherein the solid, in the first reaction zone, is reacted with an agent selected from the group consisting of H_2O , CO_2 , and mixtures thereof.

5. (Amended) The process of claim 4, wherein the solid, in the first reaction zone, is preferably reacted with H_2O .

6. (Amended) The process of claim 2, wherein the solid subjected to oxidation in the first reaction zone comprises at least one element characterized by at least two different oxidation states, stable under the reaction conditions.

7. (Amended) The process of claim 6, wherein the solid, in the two different situations, is further characterized by different amounts of oxygen and enthalpy and is capable of cyclically and continuously passing from the reduced form to the oxidized form, and vice versa.

8. (Amended) The process of claim 7, wherein at least one redox element is present in the solid as binary compound corresponding to the formula



wherein Me is selected from Ce, Fe, W, Ni;

or as compounds corresponding to the formula



a6

2013 B1

wherein Me is one or more elements selected from:

Ce, Pr, Co, Ni, Fe, Mo and W,

Z is one or more elements selected from Ce, Zr, V and Mo;

$x \geq 1$, $y \geq 0$ and $z \geq 1$.

9. (Amended) The process for claim 8, wherein Me is equal to Fe.

10. (Amended) The process of claim 9, wherein the iron is present in the solid in a quantity ranging from 20 to 60% by weight.

11. (Amended) The process of claim 10, wherein Fe is present in the solid as a binary compound together with the binary compound of cerium and/or compounds corresponding to formula (8) wherein Me = Fe and Z = Ce.

12. (Amended) The process of claim 11, wherein the compound corresponding to formula (8) is CeFeO_3 .

13. (Amended) The process of Claim 9, wherein the solid also contains a metal as promoter selected from Pt, Pd, Au and Rh.

14. (Amended) The process of claim 13, wherein the promoter is in a percentage ranging from 0.01 to 2% by weight.

15. (Amended) The process of Claim 9, wherein the solid also contains a transition metal as promoter selected from Cr, Mn, Nb and V.

16. (Amended) The process of claim 15, wherein the promoter is in a quantity ranging from 0.1 to 15% by weight.

17. (Amended) The process of Claim 12, wherein chromium is present as promoter.

18. (Amended) The process of Claim 8, wherein the reactive phase thus obtained can be used (as such) or dispersed or supported on compounds including silica, alumina, and other

pure oxides including magnesium, calcium, cerium, zirconium, titanium, lanthanum, and mixtures thereof.

19. (Amended) The process of Claim 8, wherein the reactive phase is present in a quantity ranging from 20 to 80% by weight with respect to the compound which forms the carrier or the dispersing phase.

20. (Amended) The process (wherein the reducing stream is selected from hydrocarbons, preferably aliphatic.

21. (Amended) The process of claim 20, wherein the aliphatic hydrocarbon is CH_4 .

22. (Amended) The process of claim 2, wherein the heat supply takes place (by the use) of a supplementary thermal support unit, situated between the two reaction zones.

23. (Amended) The process of claim 22, wherein the heat supply is obtained using hydrogen as fuel.

24. (Amended) The process of claim 2, wherein the heat supply is obtained using methane or natural gas as fuel.

25. (Amended) The process of claim 1, characterized in that it comprises the following operations:

- oxidation of a solid in a first reaction zone; production of H_2 or CO depending on the oxidizing compound;
- passage of the oxidized form of the solid to a subsequent reaction zone in which the reduction of the solid takes place by its reaction with a hydrocarbon;
- recovery of the reduced form of the solid and its feeding to the subsequent reaction zone;
- sending of the gaseous phase produced during the reduction of the solid to a (suitable)